**This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.**

**If you have a suggestion to make the keys better, please fill out the short survey here.**

*Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.*

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1. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-6 + 5x > 8x \text{ or } 3 + 5x < 6x$$

The solution is $(-\infty, -2.0)$ or $(3.0, \infty)$, which is option D.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5.33, -2.1]$ and $b \in [0.07, 2.55]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.2, -2.9]$ and $b \in [0.72, 2.54]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2.1, -1.12]$ and $b \in [2.92, 3.67]$

Corresponds to including the endpoints (when they should be excluded).

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-2.86, -1.35]$ and $b \in [2.86, 3.55]$

* Correct option.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

**General Comment:** When multiplying or dividing by a negative, flip the sign.

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2. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-3}{5} - \frac{10}{7}x \geq \frac{-5}{3}x - \frac{9}{6}$$

The solution is $[-3.78, \infty)$, which is option A.

A. $[a, \infty)$, where $a \in [-6, 0]$

* $[-3.78, \infty)$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-8.25, -3]$

$(-\infty, -3.78]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $[a, \infty)$, where $a \in [-0.75, 6]$

$[3.78, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [2.25, 5.25]$

$(-\infty, 3.78]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

**General Comment:** Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{9}{7} - \frac{7}{6}x > \frac{-3}{3}x + \frac{6}{8}$$

The solution is $(-\infty, 3.214)$, which is option A.

A. $(-\infty, a)$, where $a \in [1.5, 3.75]$

* $(-\infty, 3.214)$, which is the correct option.

B. $(-\infty, a)$, where $a \in [-4.5, -0.75]$

$(-\infty, -3.214)$, which corresponds to negating the endpoint of the solution.

C. $(a, \infty)$, where $a \in [0, 4.5]$

$(3.214, \infty)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

D. $(a, \infty)$, where $a \in [-3.75, -1.5]$

$(-3.214, \infty)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

**General Comment:** Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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4. Using an interval or intervals, describe all the $x$-values within or including a distance of the given values.

Less than 2 units from the number 7.

The solution is None of the above, which is option E.

A. $(-\infty, -5) \cup (9, \infty)$

This describes the values more than 7 from 2

B. $(-\infty, -5] \cup [9, \infty)$

This describes the values no less than 7 from 2

C. $(-5, 9)$

This describes the values less than 7 from 2

D. $[-5, 9]$

This describes the values no more than 7 from 2

E. None of the above

Options A-D described the values [more/less than] 7 units from 2, which is the reverse of what the question asked.

**General Comment:** When thinking about this language, it helps to draw a number line and try points.

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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 + 8x < \frac{74x - 5}{9} \leq -6 + 7x$$

The solution is None of the above., which is option E.

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [12.75, 15.75]$ and $b \in [1.5, 9]$

$(-\infty, 15.50) \cup [4.45, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

B. $(a, b]$, where $a \in [12, 16.5]$ and $b \in [2.25, 6]$

$(15.50, 4.45]$, which is the correct interval but negatives of the actual endpoints.

C. $(-\infty, a] \cup (b, \infty)$, where $a \in [10.5, 18.75]$ and $b \in [2.25, 5.25]$

$(-\infty, 15.50] \cup (4.45, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

D. $[a, b)$, where $a \in [10.5, 16.5]$ and $b \in [3.75, 12]$

$[15.50, 4.45)$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $(-15.50, -4.45]$.

**General Comment:** To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-5x + 5 > 8x + 8$$

The solution is $(-\infty, -0.231)$, which is option D.

A. $(a, \infty)$, where $a \in [-0.23, 0.79]$

$(0.231, \infty)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

B. $(a, \infty)$, where $a \in [-1, -0.15]$

$(-0.231, \infty)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $(-\infty, a)$, where $a \in [-0.1, 1.1]$

$(-\infty, 0.231)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a)$, where $a \in [-2.6, 0.2]$

* $(-\infty, -0.231)$, which is the correct option.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

**General Comment:** Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$3 + 7x > 10x \text{ or } 3 + 4x < 5x$$

The solution is $(-\infty, 1.0)$ or $(3.0, \infty)$, which is option D.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.5, 0.75]$ and $b \in [-3.75, -0.75]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4.05, -1.35]$ and $b \in [-3, 0.75]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-0.75, 3.75]$ and $b \in [0, 6]$

Corresponds to including the endpoints (when they should be excluded).

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-0.75, 1.12]$ and $b \in [0.75, 7.5]$

* Correct option.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

**General Comment:** When multiplying or dividing by a negative, flip the sign.

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8. Using an interval or intervals, describe all the $x$-values within or including a distance of the given values.

Less than 3 units from the number 8.

The solution is None of the above, which is option E.

A. $[-5, 11]$

This describes the values no more than 8 from 3

B. $(-\infty, -5] \cup [11, \infty)$

This describes the values no less than 8 from 3

C. $(-\infty, -5) \cup (11, \infty)$

This describes the values more than 8 from 3

D. $(-5, 11)$

This describes the values less than 8 from 3

E. None of the above

Options A-D described the values [more/less than] 8 units from 3, which is the reverse of what the question asked.

**General Comment:** When thinking about this language, it helps to draw a number line and try points.

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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-9 + 8x \leq \frac{35x + 3}{4} < -6 + 5x$$

The solution is $[-13.00, -1.80)$, which is option B.

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [-22.5, -7.5]$ and $b \in [-6.75, 1.5]$

$(-\infty, -13.00) \cup [-1.80, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $[a, b)$, where $a \in [-15.75, -12]$ and $b \in [-3, 0.75]$

$[-13.00, -1.80)$, which is the correct option.

C. $(a, b]$, where $a \in [-20.25, -11.25]$ and $b \in [-2.4, -0.07]$

$(-13.00, -1.80]$, which corresponds to flipping the inequality.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-16.5, -6.75]$ and $b \in [-5.62, 1.35]$

$(-\infty, -13.00] \cup (-1.80, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

E. None of the above.

**General Comment:** To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7x - 4 \leq 10x + 3$$

The solution is $[-0.412, \infty)$, which is option D.

A. $(-\infty, a]$, where $a \in [0.29, 0.5]$

$(-\infty, 0.412]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

B. $(-\infty, a]$, where $a \in [-0.82, 0.24]$

$(-\infty, -0.412]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $[a, \infty)$, where $a \in [-0.26, 0.47]$

$[0.412, \infty)$, which corresponds to negating the endpoint of the solution.

D. $[a, \infty)$, where $a \in [-0.77, -0.2]$

* $[-0.412, \infty)$, which is the correct option.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

**General Comment:** Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.